Remarks

Entry of the amendments presented, reconsideration of the application and allowance of all pending claims are respectfully requested. Claims 1-50 remain pending.

In accordance with 37 C.F.R. 1.121(c)(1)(ii), a marked-up version of the amended claims is provided on one or more pages separate from the amendment. These pages are appended at the end of the Response.

In the Office Action, claims 1-2, 24-26 and 49 were rejected under 35 U.S.C. §103(a) as being unpatentable over Chandra et al. (U.S. Patent No. 6,091,724) in view of Rochberger et al. (U.S. Patent No. 6,272,107 B1), while claims 3-15 and 27-38 were rejected under 35 U.S.C. §103(a) as being unpatentable over the combined system of Chandra-Rochberger in view of Wakeland (U.S. Patent No. 6,101,192) and claims 16-23, 39-46, 47, 48 and 50 were rejected under 35 U.S.C. §103(a) as being unpatentable over Wakeland in view of Rochberger et al. Each of these rejections is respectfully, but most strenuously, traversed to any extent deemed applicable to the amended claims presented herewith.

Independent claims 1, 16, 24, 39 & 47-50 each recite a technique for routing messages within a network environment. The technique includes, in part, receiving a message into the network and then routing the message to one or more clients of the network. The routing is accomplished based on data content of the message irrespective of any destination information that may be within the message. Further, the routing is resilient to router or link failure within the network and is accomplished without loss of the message. Based on these characterizations, applicants respectfully submit that the independent claims, as well as the dependent claims from which they depend, patentably distinguish over the teachings and suggestions of the applied patents.

Chandra et al. describe routing of messages within a network using the data content of the message. The router does not need any destination information from the message, and thus, the

message does not need to include any destination information. Instead, the router uses an annotated search data structure to determine which links correspond to consumers interested in receiving the message. The message is sent only over those links.

As noted by the Examiner, Chandra et al. do not disclose routing of messages within a network wherein the routing is resilient to router or link failure within the network. For a teaching of this concept, the Office Action relies upon Rochberger et al.

Rochberger et al. describe a method for path restoration in an ATM network utilizing point-to-point switched virtual circuits. The method of path restoration described by Rochberger et al. attempts to minimize the loss of cells in the event a node or link fails. The method described is expressly stated to be suitable for failures in point to point switched virtual circuits (SVCs) in ATM networks and makes use of the bi-directional properties of point-to-point SVC calls. The method permits the construction of an ATM network which includes call path redundancy whereby if a node or link fails, another path meeting the requirements of the call is used on an automatic basis. The switching of the path occurs with almost no data loss. See Abstract & column 4, lines 62-64.

Applicants respectfully submit that a careful reading of Rochberger et al. fails to uncover various aspects of their recited technique for routing messages within a network. For example, the independent claims presented herewith each recite that the routing is resilient to router or link failure within the network without loss of the message. This strong guarantee of message delivery, which is achieved by the various forms of delivery recited in the independent claims presented, arises from applicants' initial receipt of the message and storing of the message into persistent storage at a logging node of the network prior to providing the message to the subscribers requesting delivery. Applicants respectfully submit that Rochberger et al. expressly teaches that at least some data loss occurs by their use of "almost no data loss" when discussing the resiliency of the dual path technique presented therein. There is significant difference between the almost no data loss of Rochberger et al., and the strong guarantee of without loss of the message in applicants' invention. In Rochberger et al. there is necessarily some data loss

when the alternative or redundant path is placed into service. Whenever data loss is discussed in Rochberger et al. the loss of data is always qualified to refer to substantially no loss of data or almost no loss of data. The technique described therein is incapable of guaranteeing that there is no loss of data, and in fact, the opposite is true. When transmission is switched from one path to another, data is necessarily lost following the teachings of Rochberger et al. Since applicants employ a different technique, i.e., initially storing a message to persistent storage when it is received into the routing network, applicants are able to guarantee that message routing is resilient to router or link failure within the network. Based upon this distinction, applicants respectfully submit that each of the independent claims presented herewith patentably distinguishes over the combination of Chandra et al. and Rochberger et al.

Applicants also note that the network and messages of applicants' invention are significantly different from the network and data cells described by Rochberger et al. For example, an ATM network routes "cells" based on routing information in cell headers. A cell header typically contains a virtual path identifier (VPI) and a virtual channel identifier (VCI). Together, the VPI and VCI determine the virtual circuit (i.e., the route between two endpoints) for a message. In contrast, applicants claim a network wherein routing is based on data content of the message irrespective of any destination information that may be within the message.

Still further, an ATM network is a very low-level protocol network, which is typically classified as layer one (i.e., the physical layer) in an OSI reference model. By comparison, the network recited herein is a higher-layer protocol, for example, incorporating layers 5-7 (i.e., session, presentation and application layers).

The ATM cells of Rochberger et al. comprise 53 byte "cells" that are comprised of header and a payload. There are a variety of cell types available in the art. For example, a UNI cell contains a 5 byte header and 48 bytes of data. Only the header portion of a cell is known, i.e., understood, by the ATM network. The payload portion of a cell is simply data whose type or meaning is unknown to the network.

In contrast, a "message" as defined in the present application comprises a number of attributes, which are name-value pairs (see page 3, lines 23 & 24 of the specification). Names may be explicit in the message or they may be determined by a well-known external mapping mechanism. The length of the message is determined by the sending application. In applicants' recited invention, messages have an applicational meaning, where in Rochberger et al., the ATM cells have no applicational meaning.

For all of the above reasons, applicants respectfully request reconsideration and withdrawal of the obviousness rejected to claims 1-2, 24-26 & 49 based upon Chandra et al. in view of Rochberger et al. Claims 3-15 & 27-38 are also believed patentable for the above-noted reasons over the combined system of Chandra/Rochberger in view of Wakeland. In addition to the above-noted deficiencies of the Chandra/Rochberger combination, the Office Action notes that the combination of Chandra et al. and Rochberger et al. does not disclose storing messages within a network to persistent storage at a logging node of the network prior to message delivery to subscribers requesting delivery. For an alleged teaching of this concept, the Office Action references Wakeland.

Wakeland describes a network router with partitioned memory for optimized data storage and retrieval. The network router, which is employed for transferring data between multiple communication networks, has a network interface unit for each communication network the router is coupled to, and a single memory unit for storing the data. A section of the memory unit is allocated for each communication network. Each memory partition includes a memory subpartition allocated for each NIU. A receive unit within each NIU receives data from the corresponding network transmission medium and determines, using address information within the packetized data, which of the other NIU's should transmit the data (i.e., the destination NIU). The receive unit then buffers the receive data within the memory subpartition allocated to the destination NIU within the memory partition assigned to the receiving NIU. A transmit unit within each NIU periodically polls the memory subpartition allocated to the NIU within each memory partition for the presence of data to be transmitted. If the data is found, the transmit unit retrieves the data from the memory unit and transmits the data.

To the extent applicable to the claims presented herewith, applicants respectfully submit that Wakeland would present a technique for partitioning volatile memory in a way to support multiple different paths through a chip set. The partition to volatile memory is employed to buffer messages being forwarded through the router in order to facilitate their transmission through the router. Since Wakeland only discusses the use of a memory unit to serve as temporary storage for data received, and describes this memory unit as comprising volatile memory, applicants respectfully submit that Wakeland does not teach or suggest applicants' claimed concept of storing the message to persistent storage at a logging mode within the network. By definition, volatile memory does not comprise persistent storage, and since Wakeland does not address resiliency within the network, or any guaranteed delivery of a message within a network, applicants respectfully submit that one of ordinary skill in the art would not have modified the teachings thereof to somehow arrive at the methods, systems and article of manufacture recited in the claims presented herewith.

Applicants respectfully submit that conventionally routers do not utilize non-volatile memory for storage of network data. Since Wakeland expressly states that data is temporarily stored within data buffers, applicants respectfully submit that the memory discussed therein would be read by one skilled in the art to comprise volatile memory. A careful reading of Wakeland fails to uncover any suggestion or implication that the memory presented therein comprises non-volatile memory as expressly claimed herein by applicants. This is significant since Wakeland is not "logging" data. Wakeland is simply temporarily storing data in memory for retrieval by another device on the computer.

Because Wakeland et al. impliedly describes the use of volatile memory, which could result in data loss should the router experience a power outage, and since a careful reading of Wakeland fails to uncover any teaching or suggestion of a technique for routing messages within a network that is resilient to router or link failure within the network. Applicants respectfully submit that their claimed invention would not have been obvious to one of ordinary skill in the

art based upon the combined teachings of Chandra-Rochberger-Wakeland. Reconsideration and withdrawal of the obviousness rejection to claims 3-15 & 27-38 is therefore requested.

The remaining claims are also believed allowable for the above-noted reasons, as well as for their own additional characterizations. With respect to the rejection to claims 16-23, 39-46, 47, 48 & 50 as obvious over Wakeland in view of Rochberger, applicants note that Wakeland fails to teach logging of a message to persistent storage within a routing network. Wakeland implies partitioning volatile memory as a way of facilitating forwarding of data. This memory does not comprise persistent storage as recited by applicants. As is well known in the art, "persistent storage" refers to non-volatile memory and it would be, for example, resilient to power failure within a network. Further, Wakeland does not discuss or address the issue of resiliency within a routing network. In fact, Wakeland expressly states that should data not be routed quickly enough within a router, one or more of the data buffers may become full and any data forwarded to a full data buffer is lost in a data buffer overflow condition. Such loss data is typically retransmitted by the sender. (See column 2, lines 20-24 of Wakeland.)

As noted above, Rochberger et al. presents a technique for routing messages within a network that necessarily loses some data upon router or link failure within the network. This is contrasted with applicants' recited technique wherein messages are first logged to persistent storage prior to delivery, and subsequently routed within the network without loss of the message notwithstanding router or link failure within the network.

For all the above reasons, applicants respectfully submit that claims 16-23, 39-46, 47, 48 & 50 patentably distinguish over the combination of Wakeland in view of Rochberger et al.

In view of the above, applicants respectfully request reconsideration and withdrawal of all rejections pending in the application.

If the Examiner wishes to discuss this application further, the Examiner is invited to telephone applicants' below-listed representative. The application is believed to be in condition for allowance and such action is respectfully requested.

Respectfully submitted,

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Dated: November 14, 2002

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Marked-Up Version of Claims

In the Claims:

Please amend claims 1, 14, 16, 23, 24, 38, 39 & 46-50 as set forth below.

1. (Amended) A method for routing messages within a network, said method comprising:

receiving a message; and

routing said message to one or more clients of said network, said routing being based on data content of said message irrespective of any destination information that may be within said message, and being resilient to router or link failure within said network without loss of said message.

14. (Amended) The method of claim 1, further comprising automatically informing a sender of said message when the message has not been received by the network [lost within the network] to allow the sender to retransmit said message to the network for routing to said one or more clients of said network so that said message is delivered at least once to said one or more clients.

16. (Amended) A method for routing messages within a routing network, said method comprising:

receiving a message;

logging the message to persistent storage within the routing network; and

after said logging, delivering said message to one or more clients of said network, wherein said logging to persistent storage prior to delivery of said message to said one or more clients of said network provides resiliency of [to] said routing without loss of said message notwithstanding router or link failure within said network.

23. (Amended) The method of claim 16, further comprising automatically informing a sender of said message when said message has not been received by the network [lost within the routing network] to allow the sender to retransmit the message to the network for routing to said one or more clients of said network so that said message is delivered at least once to said one or more clients.

24. (Amended) A system of routing messages within a network, said system comprising:

means for receiving a message; and

means for routing said message to one or more clients of said network, said routing being based on data content of said message irrespective of any destination information that may be within said message, and wherein said means for routing is resilient to router or link failure within said network without loss of said message.

38. (Amended) The system of claim 24, further comprising means for automatically informing a sender of said message when said message has not been received by the network [lost within said network] to allow the sender to retransmit said message to the network for routing to said one or more clients of said network so that said message is delivered at least once to said one or more clients.

39. (Amended) A system of routing messages within a routing network, said system comprising:

means for receiving a message;

means for logging the message to persistent storage within the routing network; and

means for delivering said message to one or more clients of said network after said logging of said message to persistent storage, wherein said logging to persistent storage prior to delivery of said message to said one or more clients of said network

provides resiliency of [to] said routing without loss of said message notwithstanding router or link failure within said network.

46. (Amended) The system of claim 39, further comprising means for automatically informing a sender of said message when said message has not been received by the network [lost within said routing network] to allow the sender to retransmit the message to the network for routing to said one or more clients of said network so that said message is delivered at least once to said one or more clients.

47. (Amended) A system for routing messages comprising:

a network adapted to receive and log a message to persistent storage; and

said network comprising one or more routers adapted to route said message to one or more clients of said network, wherein said routing of said message by said one or more routers is based on data content of said message irrespective of any destination information that may be within the message, and is resilient to router or link failure within the network without loss of said message.

48. (Amended) A system for routing messages comprising:

a network adapted to receive a message;

a logger node within said network for logging said message to persistent storage; and

said network comprising one or more routers for delivering said message to one or more clients of said network, wherein said logging of said message to persistent storage occurs prior to delivery of said message to said one or more clients of said network, thereby providing resiliency of [to] said routing without loss of said message notwithstanding router or link failure within said network.

49. (Amended) An article of manufacture, comprising:

at least one computer usable medium having computer readable program code means embodied therein for effecting routing of messages within a network, the computer readable program code means in the article of manufacture comprising:

computer readable program code means for causing a computer to effect receiving a message; and

computer readable program code means for causing a computer to effect routing said message to one or more clients of said network, said routing being based on data content of said message and being resilient to router or link failure within said network without loss of said message.

50. (Amended) An article of manufacture, comprising:

at least one computer usable medium having computer readable program code means embodied therein for effecting routing of messages within a routing network, the computer readable program code means in the article of manufacture comprising:

computer readable program code means for causing a computer to effect receiving a message;

computer readable program code means for causing a computer to effect logging said message to persistent storage within the routing network; and

computer readable program code means for causing a computer to effect delivering said message to one or more clients of said network after said logging thereof, wherein said logging to persistent storage prior to delivery of said message to one or more clients of said network provides resiliency of [to] said routing without loss of said message notwithstanding router or link failure within said network.